



United States Department of Agriculture
Economic Research Service & National Agricultural Statistics Service

Agricultural Resource Management Survey (ARMS)

Uses of ARMS Data

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Agricultural Resource Management Survey (ARMS)

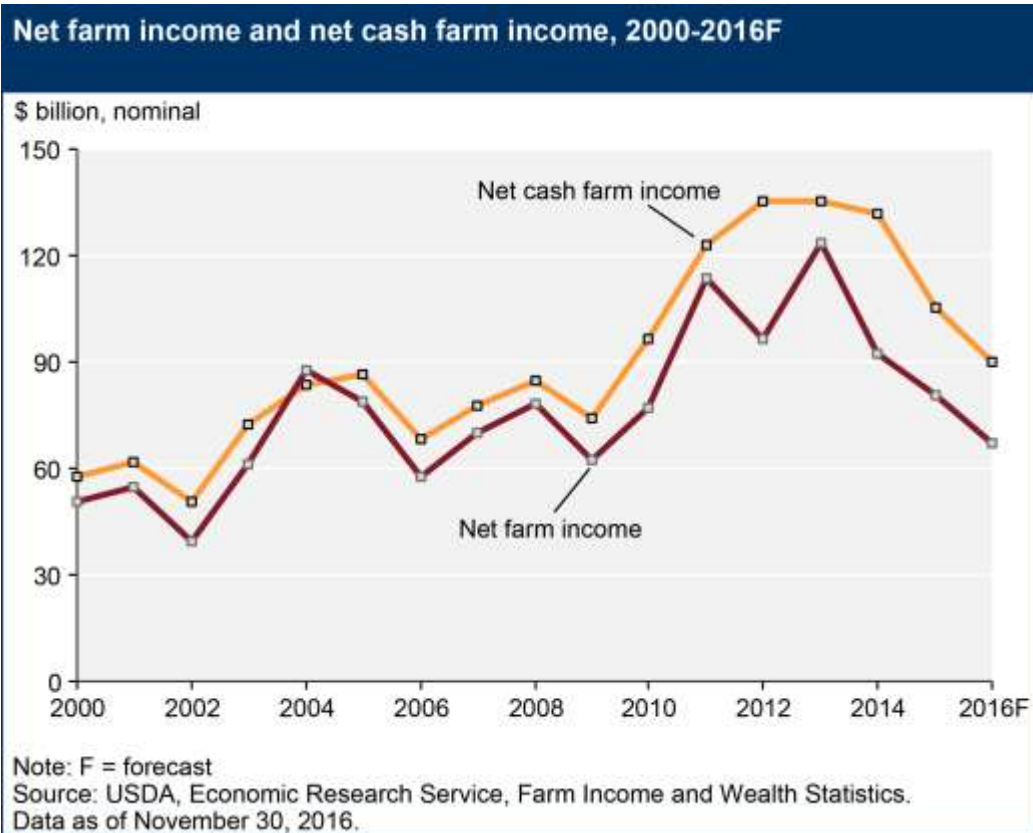
Major ERS Uses of ARMS Data

- Financial reporting & other data releases
 - On farm sector, farm businesses, farm households
 - Via ERS webinars, web data-tool, & postings
- ERS reports on policy-relevant issues
 - Posted on website and available to all
- ERS custom reports (staff analyses)
 - Unpublished, for policymakers; Quick turnaround



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ARMS Uses: Financial reporting Net cash income forecast to fall 14.4% from 2015



Note net farm income vs. net cash income

Net farm and net cash hit records in 2013



Agricultural Resource Management Survey (ARMS)

ERS Farm Financial Reporting

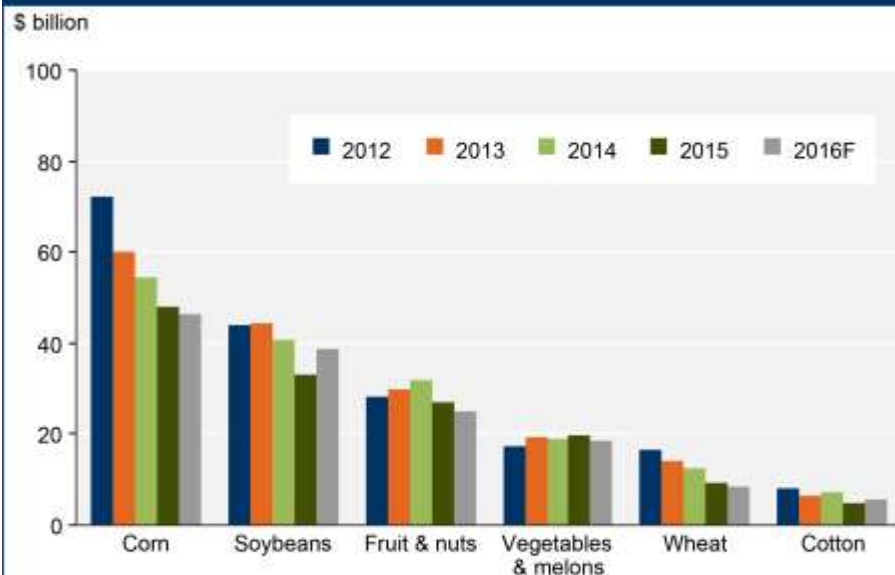
- That's the 2016 *forecast*. ERS also provides *estimates of what did happen*.
 - For the headline numbers, as well as for component expense and revenue items.
 - For farm sector, and breakouts
- ARMS provides about $\frac{3}{4}$ of the data used in the farm sector accounts.

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ARMS Detail Allow Us to Break Down Changes in Net Farm Income

*Notice: declining cash receipts, from falling commodity prices, drive this decline
But prices haven't fallen enough to trigger large increases in government payments*

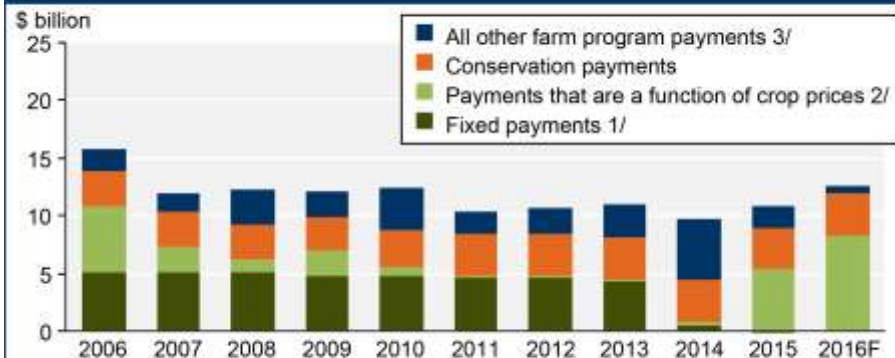
U.S. cash receipts for selected crops, 2012-2016F



Note: F = forecast

Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of November 30, 2016.

Government farm program payments to farm producers, 2006-2016F



Note: F = forecast.

1/ Includes direct fixed payments portion of Direct and Counter-Cyclical Program (DCP) and Cotton Transition Assistance Program (CTAP) payments. CTAP was designed to make payments only in 2014 and 2015.

2/ Includes counter-cyclical payments (CCP), average crop revenue election (ACRE) payments, loan deficiency payments, marketing loan gains, and certificate exchange gains. The certificate exchange program (CEG) ended after making payments for the 2009 crop year but was restored beginning with the 2015 crop year. CCP and ACRE were not continued in the 2014 Farm Bill. Price loss coverage (PLC) and agricultural risk coverage (ARC) payments began in 2015.

3/ All other payments include supplemental and ad hoc disaster assistance, tobacco transition, and dairy programs.

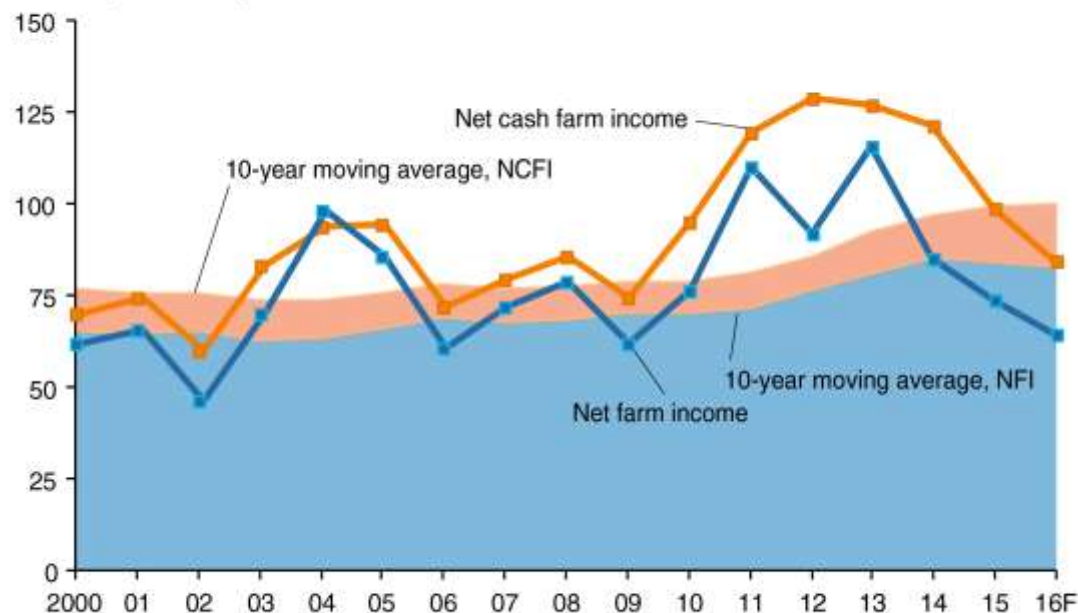
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of November 30, 2016.

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Farm income has fallen from record levels...

Net cash farm income (NCFI) and net farm income (NFI),
inflation adjusted, 2000-16F

\$ billion (2009 dollars)



F = forecast. The GDP chain-type price index is used to convert the nominal (current-dollar) statistics to real (inflation adjusted) amounts (2009=100).

Source: USDA, Economic Research Service, Farm Income and Wealth Statistics. Data as of August 30, 2016.

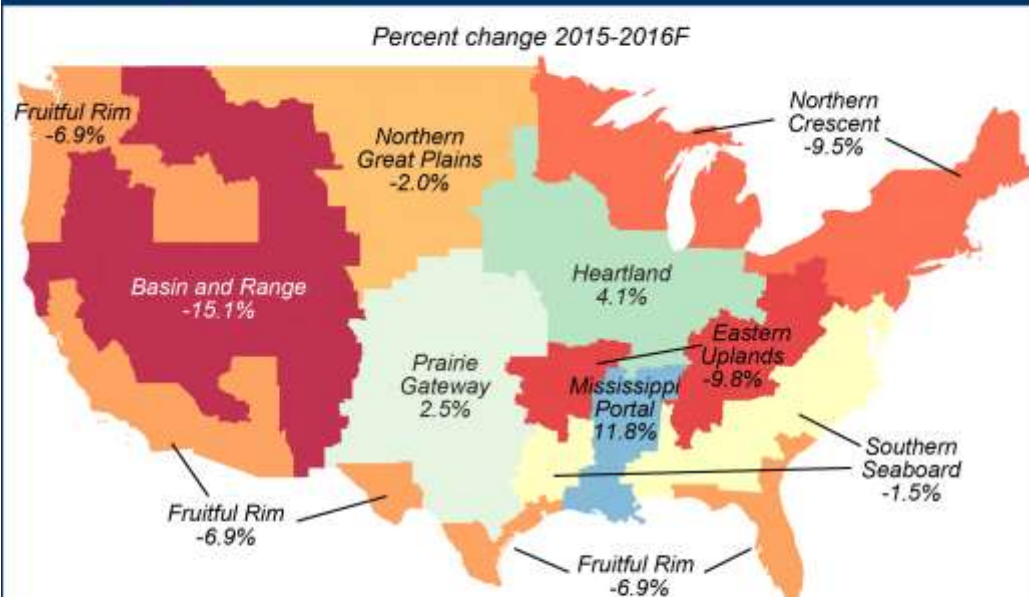
Net cash and net farm income are forecast to fall well below long-term averages



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ARMS Supports Forecasts for Regions

Farm business average net cash farm income by resource region, 2016F compared with 2015



Note: F = forecast. The partial budget forecast model is based on the 2015 Agricultural Resource Management Survey (ARMS) using parameters from the sector forecasts. The model is static and does not account for changes in crop rotation, weather, and other location-based production impacts that occurred after the base year. Data as of November 30, 2016.

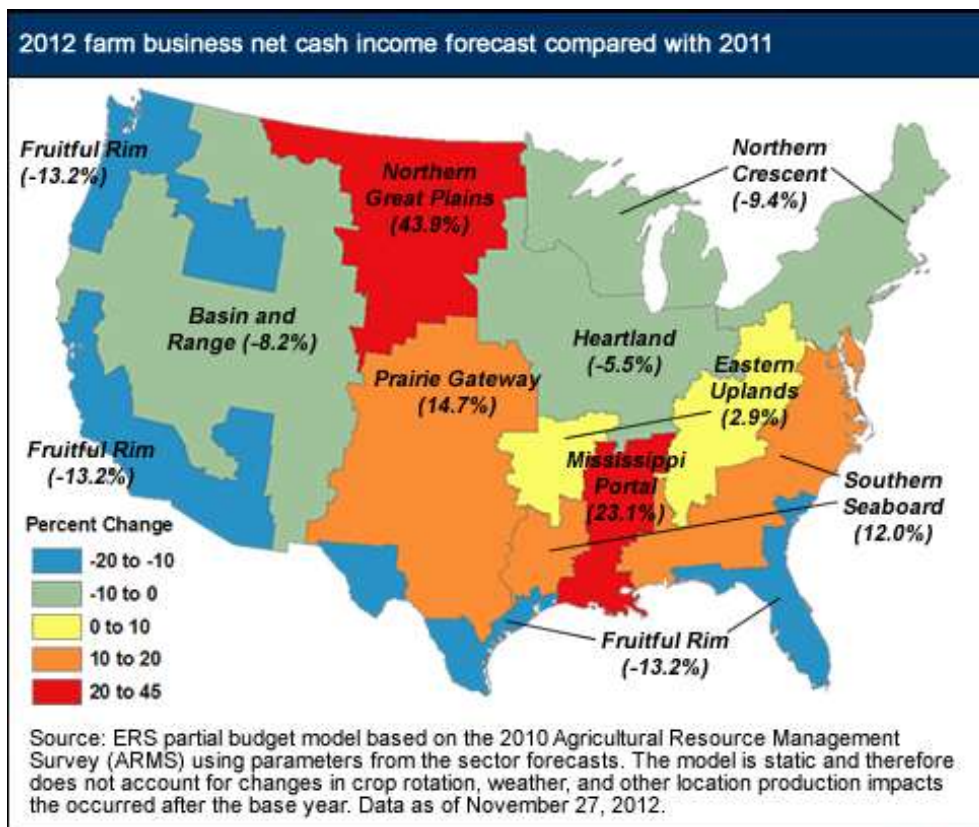
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.

Net cash income is forecast to fall in all regions but the Mississippi Portal, but there's substantial variation.



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Compare to 2012...



Particularly the Northern Great Plains, Prairie Gateway, and Mississippi Portal

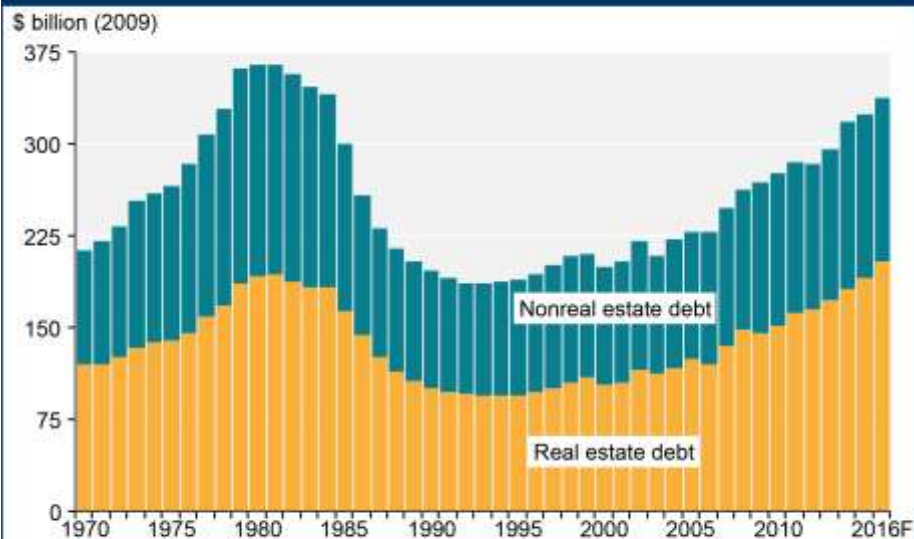
What happened? Drought, but price increases and crop insurance offset production declines for crops. Livestock hit by drought and feed price increases.



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ARMS Also Underlies ERS Balance Sheet Analyses

Farm sector debt, inflation adjusted, 1970-2016F

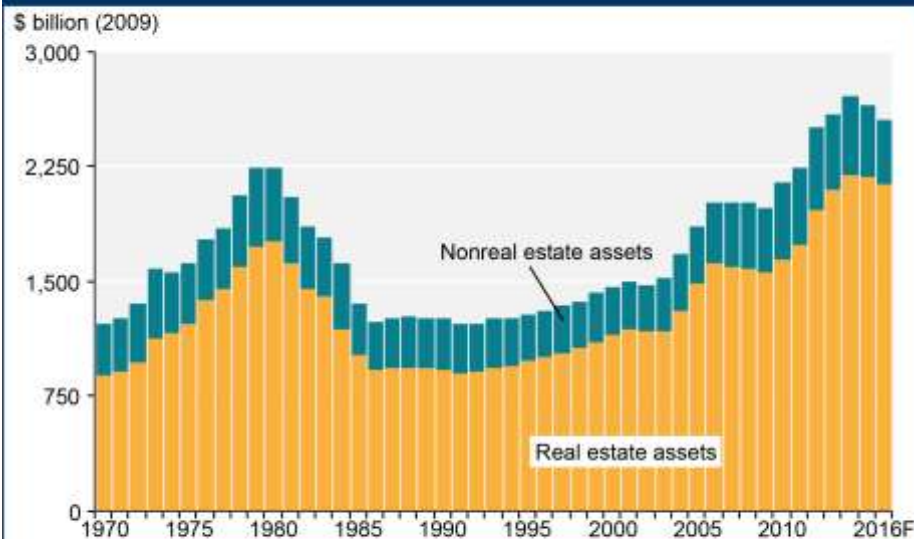


Note: F = forecast. The GDP chain-type price index is used to convert the nominal (current-dollar) statistics to real (inflation adjusted) amounts (2009=100).

Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.

Data as of November 30, 2016.

Farm sector assets, inflation adjusted, 1970-2016F



Note: F = forecast. The GDP chain-type price index is used to convert the nominal (current-dollar) statistics to real (inflation adjusted) amounts (2009=100).

Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.

Data as of November 30, 2016.

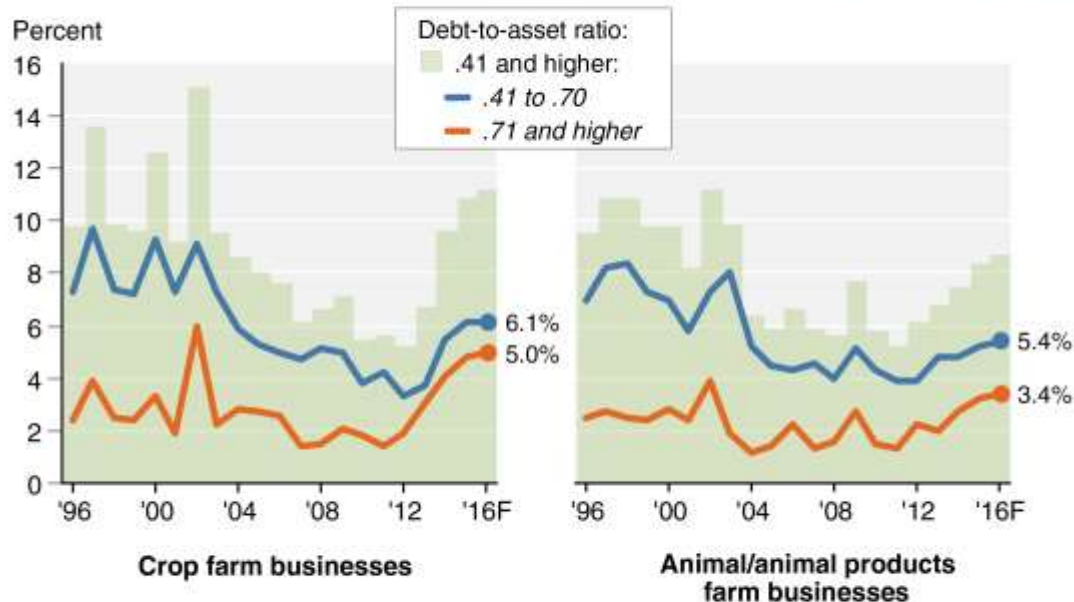
What's different between 2016 and 1983?

Can we use ARMS to identify what types of farms are at risk?

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We can focus in on farms that are highly leveraged

**U.S. crop and livestock farm businesses by leverage levels
(measured by debt-to-asset ratios), 1996-2016F**



Note: Farm businesses are defined as operations where farming is reported as the operator's primary occupation, or as any operation with annual gross cash farm income of at least \$350,000.
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey. Data for 2015 and 2016 are forecasts as of February 9, 2016.



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Who Wants This Information? Not Just Policymakers

- Input providers
 - Cash income drives equipment purchases. What will equipment/chemical/seed/feed demand look like?
- Lenders & Investors
 - What are the risks? What guidelines should I use?
 - Poor information is worse than pessimistic info
- Extension and farm advisors
 - They are how information and advice get to farmers



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Use in Policymaking

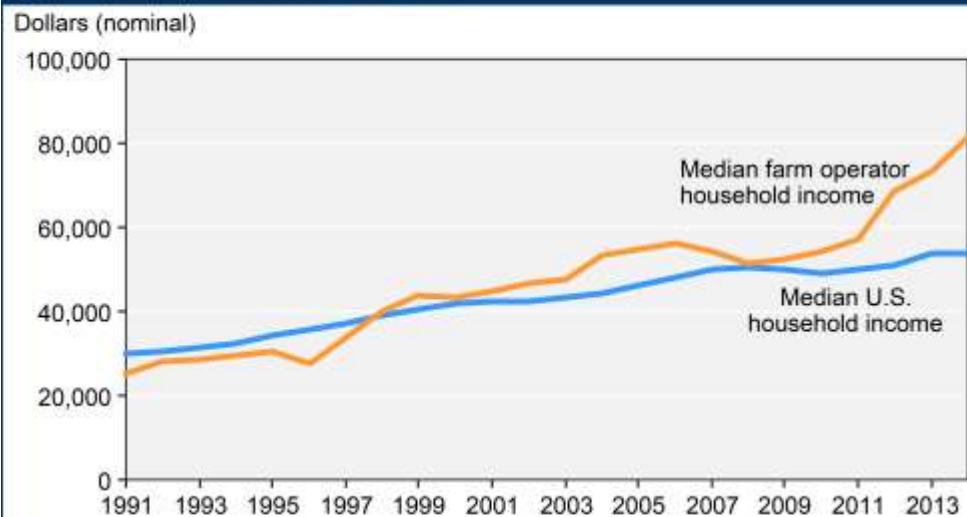
- Congress, USDA, and others use ARMS-based data
 - Including National Corn Growers, American Soybean Association, National Pork Producers, American Farm Bureau, and other farm groups
 - Easy access to fundamental & detailed finance data
 - ERS reports are widely available; Congress and USDA also ask for custom reports
- Informs Farm Bill discussions, & implementation
 - And other agriculture-related policy



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ERS Also Uses ARMS to Estimate Farm Household Income

Median farm operator household income compared with median U.S. household income, 1991-2014



Note: Differences between farm operator income estimates from 2012-14 and estimates from prior years reflect changes in survey methodology and implementation associated with the 2012 Agricultural Resource Management Survey in addition to changes in the economic situation of farm households.

Source: USDA, Economic Research Service and National Agricultural Statistics Service, Agricultural Resource Management Survey and U.S. Census Bureau, Current Population Survey. Data were revised May 2, 2016.

Net of farm expenses, and including income from off-farm sources

Provides a direct measure of how farmers are doing, not just farm businesses

Household income needed to assess:

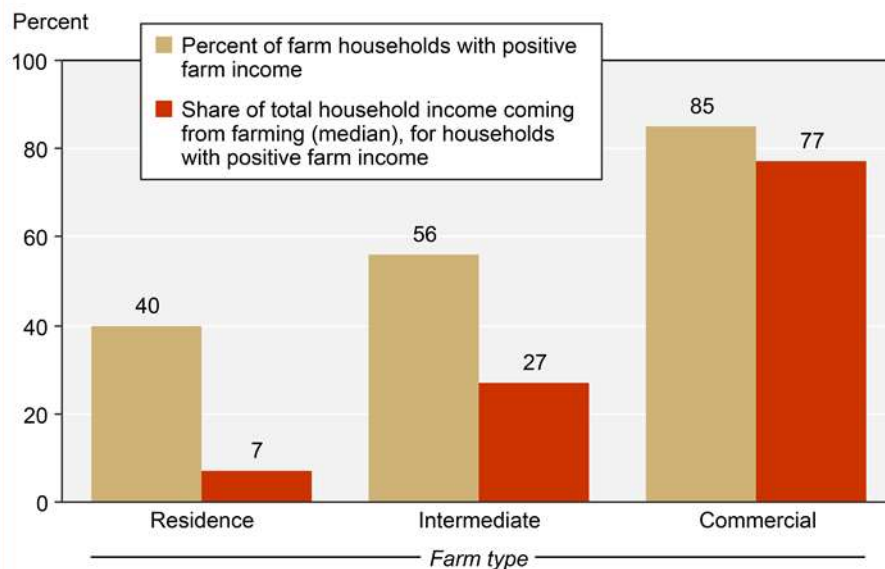
- 1) How tax proposals work*
- 2) Full impacts of farm policies*
- 3) How changes in the farm economy—from crop prices, drought, an export boom--affect farm households*



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Farms vary a lot; detail, provided by ARMS, matters

Percent of farms with positive farm income, and their median share of total household income coming from farming, 2014



Source: USDA, Economic Research Service and National Agricultural Statistics Service, Agricultural Resource Management Survey. Data were revised May 2, 2016.

Residence farms: farming is not the principal occupation, & sales are less than \$350,000

Intermediate farms: farming is the principal occupation, & sales are less than \$350,000

Commercial farms: sales of at least \$350,000

10 percent of U.S. farms are commercial, while 31 percent are intermediate and 59 percent are residence farms

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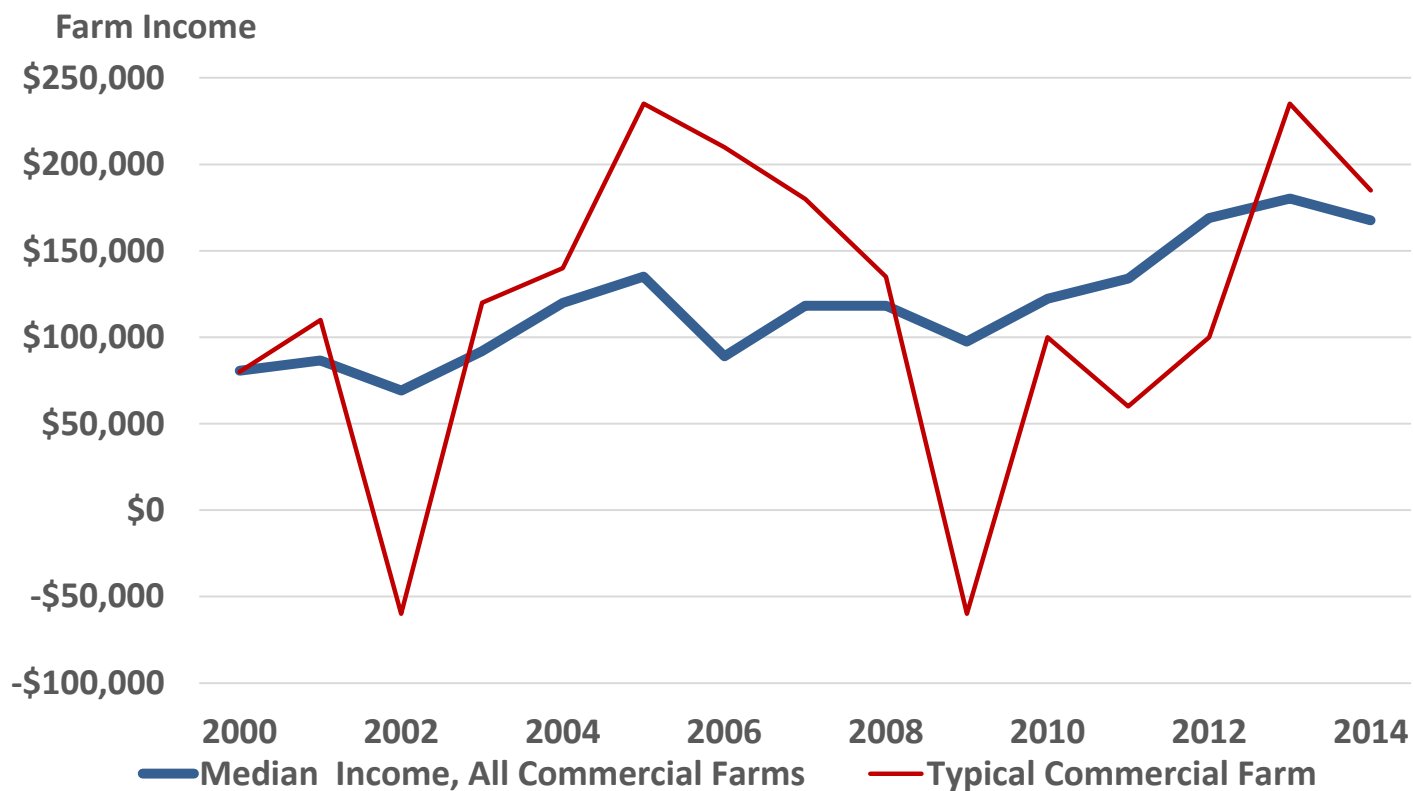
Household Data Use: Income Volatility

- Farm household income = farm + off-farm income
 - **Farm income** is share of farm-related net income that goes to principal operator's household (can be negative)
 - **Off-farm income** includes off-farm wages and salaries, other business income, capital gains, and transfers to the household
- Farm households face greater income risk than non-farm households:
 - Fluctuations in yields, prices, land rents, input prices (business risk)
 - Rare events such as disease, droughts, flooding (production risk)
 - Changes in government policies
 - ➔ Farm households experience a median change 8 times greater than non-farm households



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Farm incomes are volatile



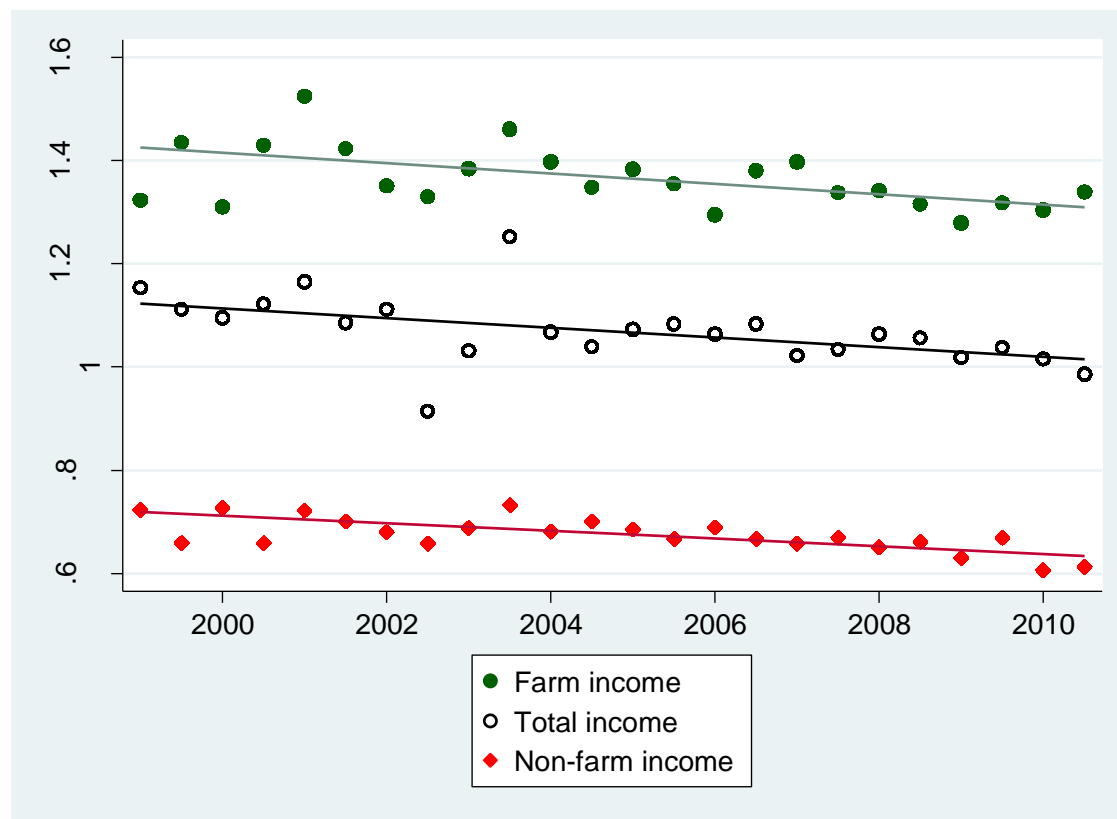
The average across all farms seems to rise steadily.

But individual farms show great volatility, with losses in some years, and wide swings.

This is net income from farming, for commercial farms (at least \$350,000 in sales).

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Farm household income, farm income, and off-farm income volatility have declined



- *The dots measure the average year-to-year variation in income for farm households: volatility.*
- *Some years are more volatile than others (a wider spread).*
- *Farm income is more volatile than non-farm income for farm households.*
- *Farm households use off-farm income to manage fluctuations in their income from farming*



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Why Does Risk & Income Volatility Matter?

- For design of farm programs:
 - Consider the shift away from direct payments and toward crop insurance and other risk-based policies.
 - Has policy played a role in declining volatility?
- The fact of high income volatility affects how we design other policies
 - Such as tax & conservation policies
- Income risks affect farmer decisions
 - Planting, fertilizer use, capital investments



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Uses: ARMS in National Economic Accounts

- ERS farm income estimates enter into:
 - National Economic (GDP) accounts
 - State Personal Income & Local Area Income estimates
- GDP estimates used for national economy measurement and policymaking
- Farm income is small share of national GDP
 - But an important source of year-to-year variation



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ARMS Uses: State & Local Income Estimates

- Formula allocation of federal funds
 - Medicaid, Supplemental Security Income
 - Agricultural research & extension, USDA ag lending
- Local planning of public investment
 - Public utilities, highways, hospitals
- Private investment
 - Local retail & wholesale facilities



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ARMS Uses: NASS Reports

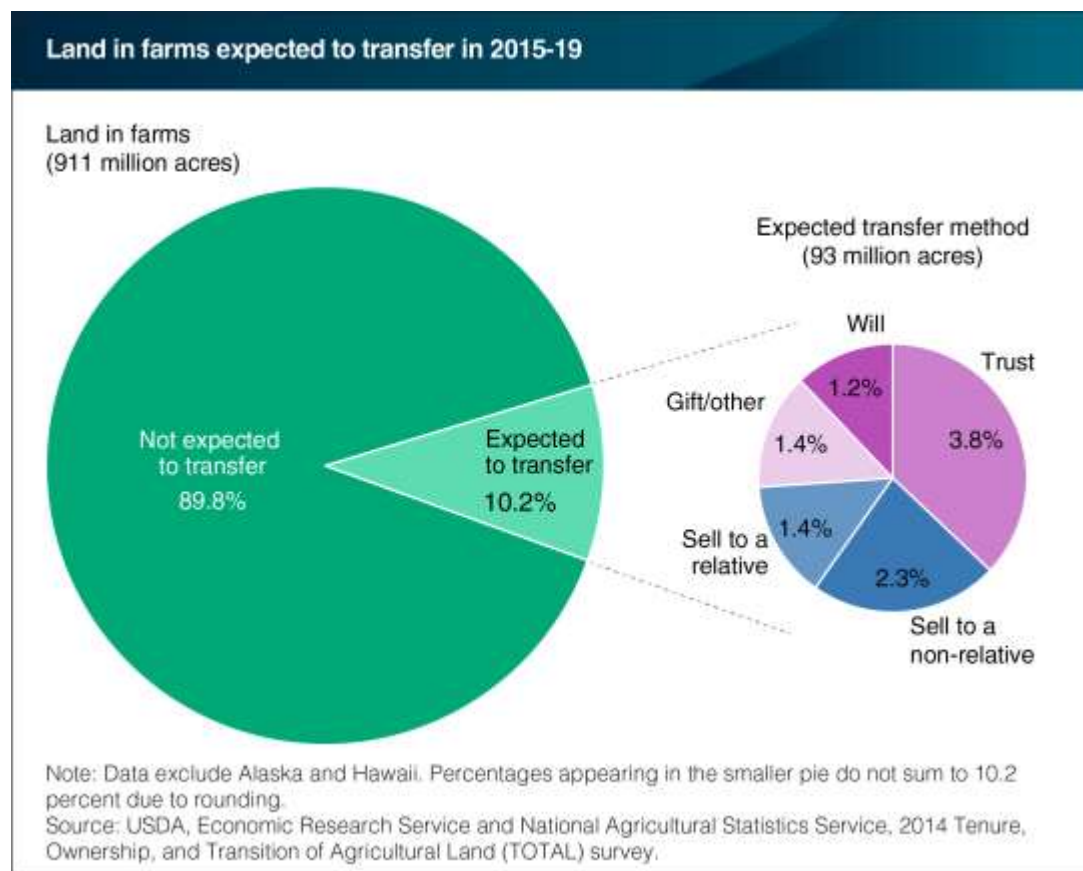
- Farm Production Expenditures report
- Vegetable Chemical Use data
- Fruit Chemical Use data
- TOTAL report





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From *U.S. Farmland Ownership, Tenure and Transfer*:
10 percent of US Farmland expected to transfer in 2015-19.



From 2014 ARMS/TOTAL. First landownership survey since 1998.

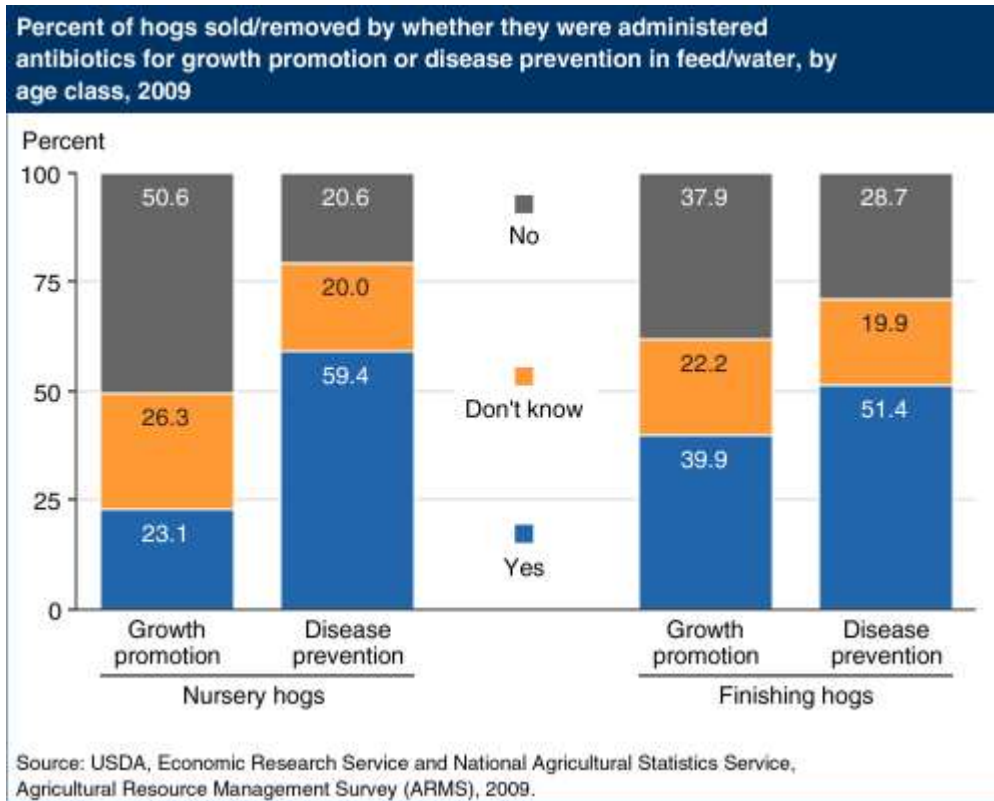
Identified ownership patterns, rental arrangements, methods of land acquisition.

Things we learned:



Agricultural Resource Management Survey (ARMS)

From *Economics of Antibiotic Use in US Livestock Production*



Many antibiotic drugs are used in human and animal medicine.

Many drugs are losing effectiveness because microbes are developing resistance, and this has become a major global public health issue.

The US now bans the use of certain antibiotics for animal growth promotion, and retail food chains are placing further restrictions.

ARMS provides baseline data on use in hog and broiler production, and ties to other production practices.

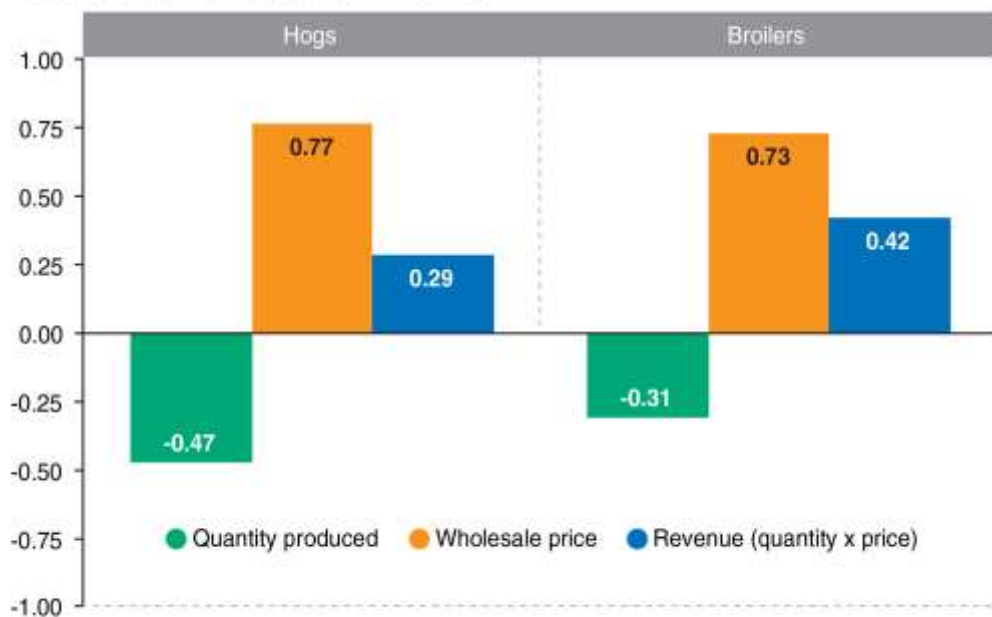


Agricultural Resource Management Survey (ARMS)

From *Economics of Antibiotic Use in US Livestock Production*

Simulation results of a full ban on antibiotic use for production purposes in hogs and broilers: effects on quantity, price, and revenue

Percent change in quantity, price, and revenue



Source: USDA, Economic Research Service.

ERS used ARMS & market data to simulate likely effects of a full US ban on using antibiotics for growth promotion.

Projected market effects are small (less than 1 percent changes in price & quantity, because:

- 1) Effects of antibiotics on animal growth are shrinking, because of improvements in production practices;*
- 2) Some producers don't use antibiotics for growth promotion*

There is a lot of uncertainty on this major issue, and ARMS adds valuable information.

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Example of a custom report: ARMS data used to support market access for US poultry.



China imposes tariffs on imports of US poultry products, on grounds that US government subsidizes production.

US government uses ARMS data and ERS reports to show how broiler production is organized and financed

US wins World Trade Organization (WTO) cases (2010 and 2016), gains reductions in Chinese poultry tariffs



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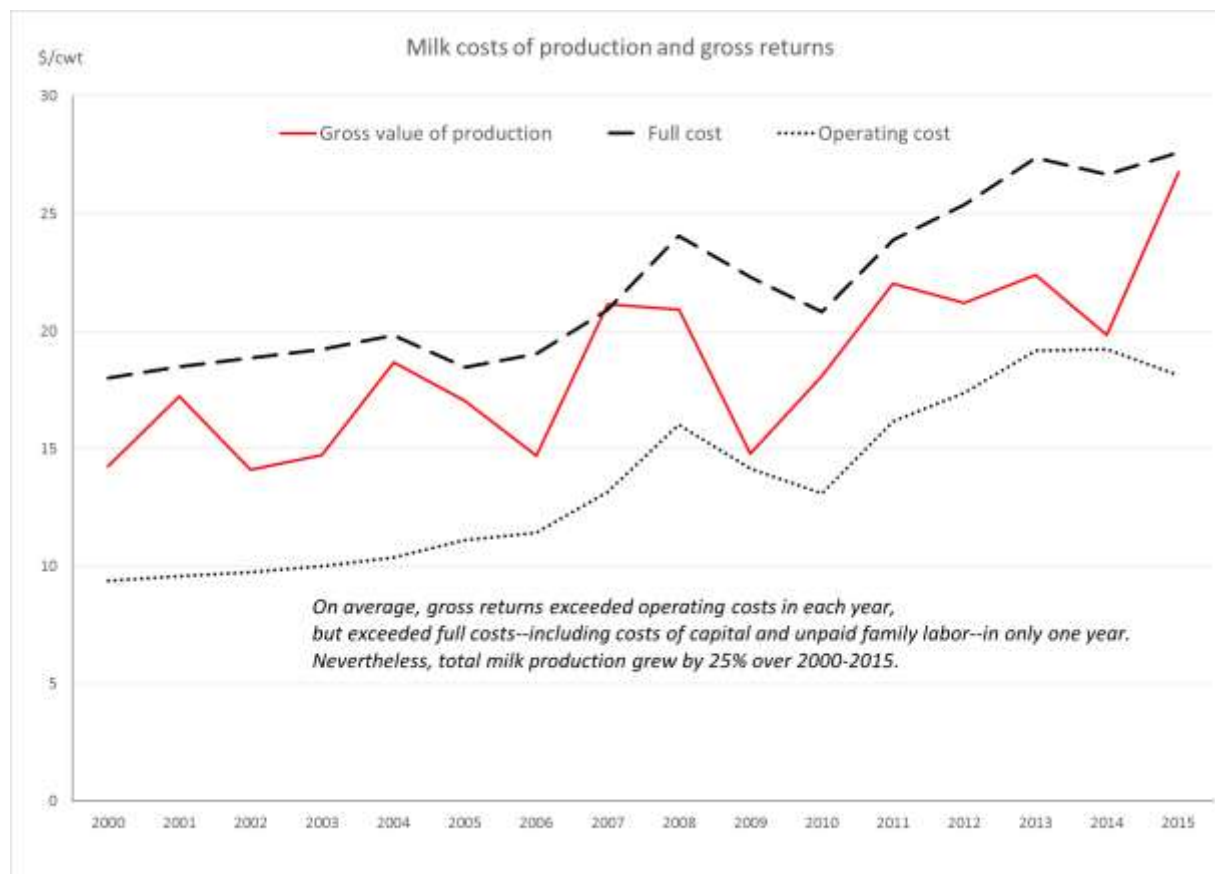
What's New: Dairy and Corn Versions in 2016

- Previous ARMS Dairy Versions—2010, 2005, 2000, 1993 (in FCRS)
 - Gives baseline for annual cost and returns estimates
 - Used to understand changing dairy sector
 - Includes an organic subsample again this year
- Dairy version will be enumerated this year.
 - Questionnaire is shortened
 - Can we maintain the value of this data?



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ARMS Dairy Underlies ERS Milk Cost and Returns Estimates



ARMS provides the baseline data for annual ERS milk cost of production estimates.

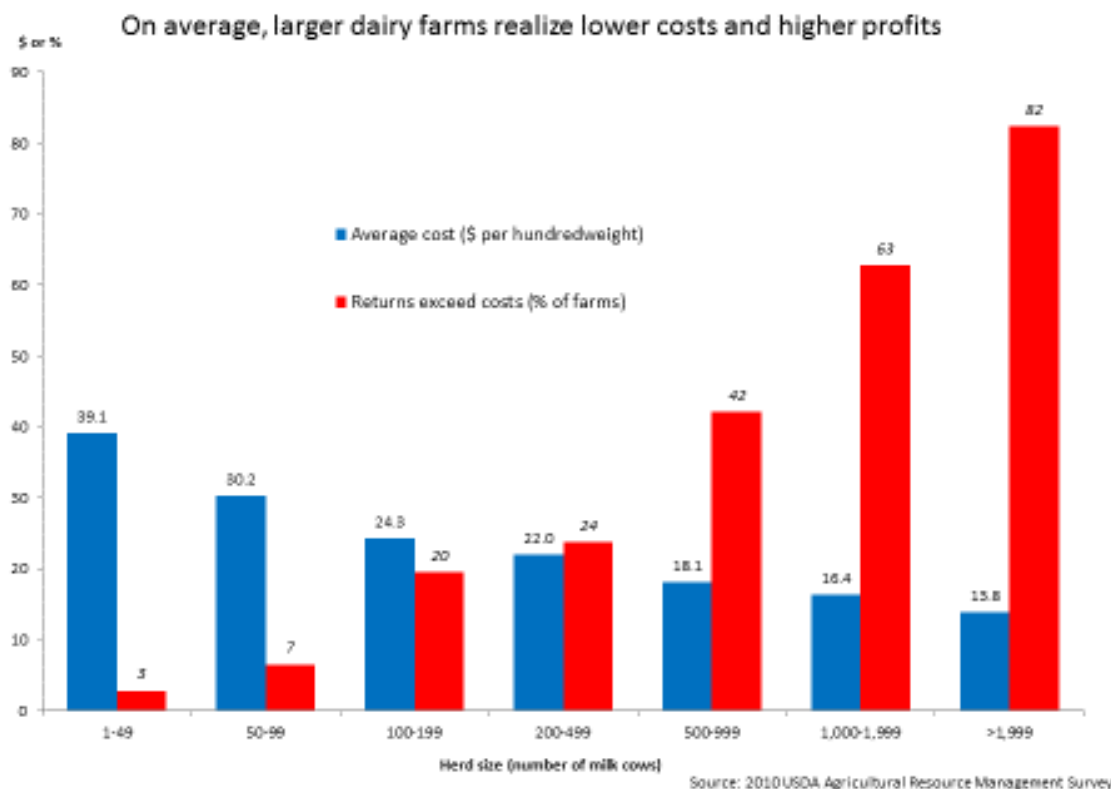
ERS aims to measure all costs, including annualized costs of capital equipment and costs of unpaid family labor, in addition to cash operating expenses.

The gross value of production includes milk sales revenue, but also revenues from culled animals and manure value.

Note the wide fluctuations in gross values, reflecting milk price movements and highlighting financial risks.

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Costs, and net returns, vary widely across dairy farms



From the 2010 ARMS, note that large operations had much lower costs than others, and can make money when others are losing money.

Consequently, production has been shifting to larger operations.

*Challenges for dairy policy:
How to best manage risks?
Should policy assist smaller farms?*

ARMS provides information essential to these issues.



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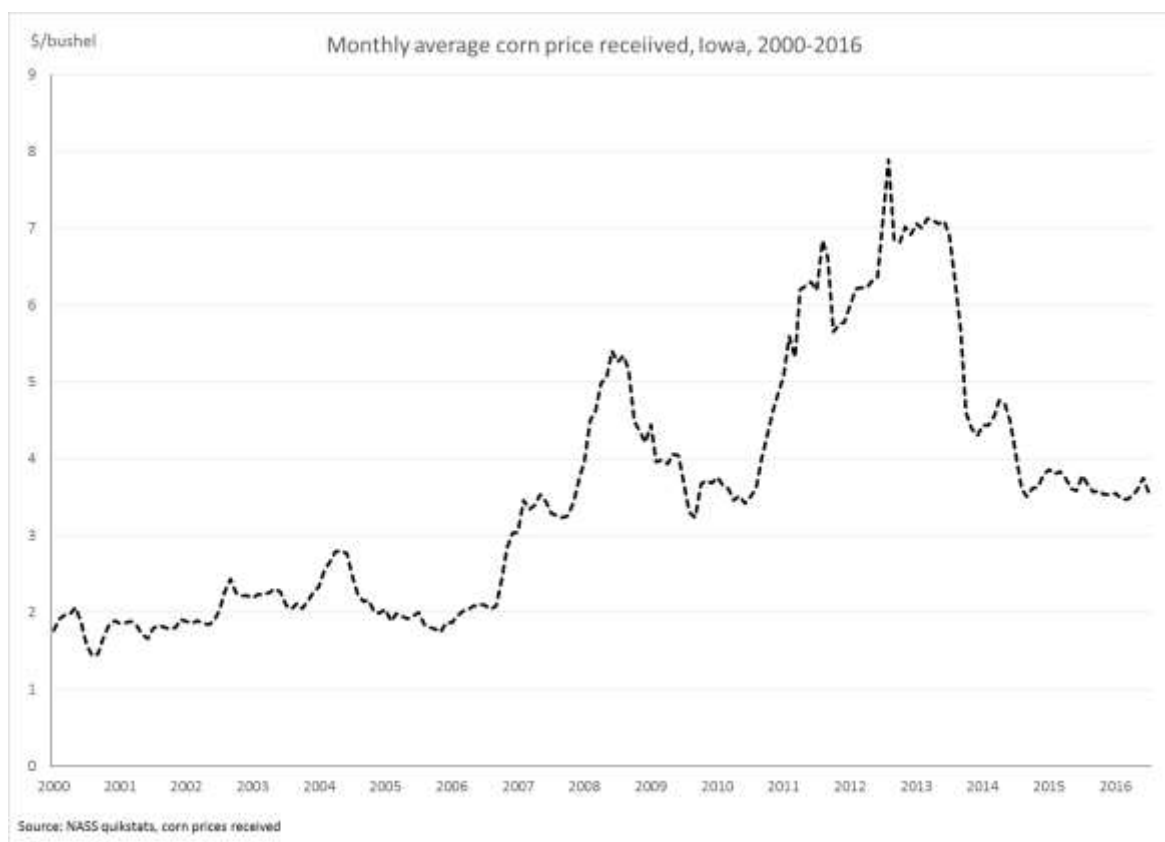
Also New in ARMS 2016

- Seed technology, risk management, and soil management practices (Section B, items 6-13)
- Seed technology (genetically engineered seeds)
 - Note corn, cotton, soybeans, but also hay (alfalfa), canola, and sugar beets in item 6.
 - ARMS provides only source of nationally representative information on GE hay, canola, sugar beets.
 - These questions follow up on 2013 ARMS questions, published in recent ERS report.



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Risk Management Module



Farmers face price risks, for products and inputs; they also face yield, or production, risks arising from weather or from pests. They can face a range of other risks as well.

USDA offers some programs, like crop insurance or the Margin Protection Program (Dairy), that are intended to help farmers manage risks.

Farmers can also manage risks through production and marketing practices



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ARMS Questions Aim to Track Farmers' Risk Management Choices

- To improve program management and to evaluate impact of choices on risks
- Item 7: crop insurance choices
 - Acres planted, and acres insured, by crop and policy type
- Items 8-10: risk management strategies
 - Use of futures and options, by commodity
 - Note commodities and quantities
 - Use of storage & cooperatives



Agricultural Resource Management Survey (ARMS)

A Summary: Major Uses/Users of ARMS data are ...

- **Farm Financial (Net Farm Income)** reporting and forecasts
- **Custom Reports** for policy makers who affect farmers everyday
- **Special Reports** that answer questions on current hot topics
- Major information source for **Farm Bills and Ag Policy**
- Agricultural Component of **GDP**
- Part of Formulas to **Allocate Tax Dollars**
- **Crop Insurance and Disaster** damage estimates
- **Lenders, Manufacturers, Suppliers, & Retailers** decisions
- Farm **Commodity groups**, for analysis and advocacy
- **Data Summaries Available** to all through the web tool



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Why is ARMS Valuable?

- It's Representative, Comprehensive, Objective
- Links Enterprise, Whole Farm, & Household
- Tracks Income Statement & Balance Sheet Items
 - Links to production and marketing decisions

Agricultural Resource Management Survey (ARMS)

That Value Comes from a Full Team

- ERS
 - Objective analyses & economic expertise
- NASS
 - Survey design, management, & production expertise
- NASDA enumerators
 - Producer cooperation & guidance, ground truthing
- Producers
 - Time, knowledge, thoughtfulness



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Policy Decisions Will be Made with or Without ARMS

• Policymakers...

- Some have farm backgrounds, most don't
 - Those that do can't just rely on background, experience
 - They're all busy, so they rely on others for information
-
- ARMS provides accurate data on U.S. agriculture
 - Better information makes for better decisions



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Additional Information

- The Phase III Interviewers Manual
- ERS website: www.ers.usda.gov
- Charts of Note: read and sign up for free distribution at
 - <http://www.ers.usda.gov/data-products/charts-of-note.aspx>
- Farm Sector Income Forecast:
 - <http://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances.aspx#.Up4zByfQxnE>
- Thanks!!